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The influence of the nuclear self energy function on the spectral lines of atoms with unstable nuclei

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Abstract

Optical emission from atoms with radioactive nuclei is investigated. The self energy function of the unstable nucleus is constructed. A new arbitrary parameter characterizing the nuclear interaction is introduced. The instability of the atomic nucleus is shown to result in the essential broadening of optical emission lines. The spectral line shape is shown to be of the Lorentz form, with the width being a nonlinear combination of the nuclear and atomic decay widths multiplied by the parameter depending on the peculiarities of nuclear interaction.

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